2004 GALVESTON BAY INVASIVE SPECIES RISK ASSESSMENT
INVASIVE SPECIES SUMMARY
Created by: Environmental Institute of Houston, University of Houston-Clear Lake
and the Houston Advanced Research Center

**Common Name: Boll weevil**

**Latin Name**: *Anthonomus grandis*

**Category:** Terrestrial Animal

**Place of Origin:** Mexico and Central America

**Place of Introduction:** "Brownsville, Texas (http://www.tpma.org/bwe/texas_program.html). Southern United States: 1892 The bane of cotton growers in the South for almost a century. Since entering fields in the United States from Mexico, caused $100 million of damage annually, totaling a $12 billion drain to the economy (http://www.ceris.purdue.edu/napis/pests/bw/facts.txt)."

**Date of Introduction:** 1892

**Life History:** "The adult boll weevil spends the winter in hibernation, called "diapause," without food and returns to cotton in the early spring the following year. Overwintering quarters usually consist of fence rows, broadleaved plant litter along creek bottoms, ditch banks and other protected, wooded areas near cotton fields. In the spring overwintered boll weevil adults concentrate in early planted fields nearest overwintering habitat where cotton is squaring. Adult boll weevils feed on tender growth in plant terminals if the young cotton does not have squares. In the early season, boll weevils colonize localized spots and do not generally invade the entire field.

The boll weevil is a pollen feeder; its survival is diminished without squaring cotton, although adult boll weevils emerging from overwintering quarters may subsist on other plants for short periods (e.g., an average of 18 days on yellow woolywhite in the Rolling Plains area). After adult weevils feed on cotton for 3 to 7 days and mate, they lay eggs in squares that have reached at least the "one-third grown stage" (approximately 1/4 inch in diameter). Egg laying may occur in smaller squares; however, sufficient feeding material is not available for a high percentage of larvae to develop to the adult stage. Late in the season eggs may be laid in small bolls, but squares are preferred.

It takes the eggs 2.5 to 5 days to hatch into the grub-like larva that feeds inside the square or small boll. After larval development begins the infested square turns yellow, bracts open or flare and the fruiting form falls off the plant. The larva feeds for 7 to 14 days before pupating inside the square or small boll. During the next 4 to 6 days the pupal stage changes into an adult boll weevil. The newly developed adult eats its way out of the square or small boll and feeds on other fruiting forms for about 5 days. During this time the weevil mates and females begin to lay eggs. The entire cycle takes 16 to 18 days under ideal conditions. Six or seven generations may be produced each year with each female having the capability of laying approximately 200 eggs (http://insects.tamu.edu/extension/bulletins/b-933.html#boll%20weevil)."

**Growth/Size:** One-quarter to one-half inch long. (http://www.ceris.purdue.edu/napis/pests/bw/facts.txt).

**Feeding Habits/Diet:** Cotton. "This pest lays its eggs inside the unripe cotton boll, and the young weevils then eat their way out (http://www.simplelife.com./organiccotton/08WEEVLsng.html)."

**Habitat:** Cotton fields

**Physical Description: "**The adult boll weevil is a brown to grayish-brown beetle. The body is covered with short, fine hair, giving it a fuzzy appearance. There is considerable variation in size from slightly more than 1/8 inch to almost ½ inch in length. The boll weevil's snout is approximately half as long as its body. It is slightly curved and has chewing mouthparts on the end. Immature stages are found inside squares and bolls. The boll weevil egg is seldom seen since it is deposited inside a square or boll. The larva is a small, legless grub with a brownish head and chewing mouthparts. This grub varies in size from very small to ½ inch in length. The pupal or "resting" stage of the boll weevil is 3/8 to ½ inch long and cream colored with eyes and an obvious snout (http://insects.tamu.edu/extension/bulletins/b-933.html#boll%20weevil)."

**Management Recommendations / Control Strategies:** include references for existing site-specific strategies

"In the cooperative boll weevil eradication program, APHIS supplies equipment, technical and administrative support and funds up to 30 percent of program costs. Growers pay at least 70 percent of program costs. The program has been successful in eradicating weevils from Virginia and the Carolinas, Georgia, Florida, south Alabama, California, and Arizona (http://www.aphis.usda.gov/ppq/weevil/)**."**

"The control part of the eradication program consists of cultural, mechanical and chemical control: (1.) Cultural Control: windows for uniform cotton planting and harvesting, as organized by grower advisory committee in each zone, are key components of cultural control by providing the necessary host-free period. In the SRP and RPC, most growers started to plant on or about May 15. Growers began planting February 15 in the ST/WG. In RPC, due to the severe drought conditions experienced in 1998, growers were offered a

rebate to destroy failed cotton fields through September 21 in an effort to reduce insecticide treatments. In zones with mandatory stalk destruction rules and regulations, such as the ST/WG zone in which temperate climates may induce regrowth during the winter months (off-season), TBWEF personnel assisted TDA in maintaining a host-free period. Information was provided to TDA identifying fields that were out of compliance with plow-up regulations before the stalk destruction date. Additionally, the TBWEF continued to offer an early plow-up rebate as an incentive for growers to destroy cotton stalks as soon as possible after harvest.

(2.) Mechanical Control: while the primary function of the trap was to measure the adult boll weevil population densities and identify their locations, another key benefit was removing portions of these populations in the process (El-Lissy, 1998).

(3.) Chemical Control: a single Fyfanon® ULV (12.0 fl oz/ac, 0.92 lb [AI]/ac) application was made to fields that had reached the treatment criteria (action threshold). The action threshold was a trap catch of two adult boll weevils per 40-acre field, or if weevil colonization were evident. In SRP, the action threshold remained the same throughout the growing season. In RPC the action threshold was increased to five and in ST/WG to seven adult boll weevils per 40- acre field during the mid-season period (bloom to early open boll phenology), then reduced back to two weevils beginning at the early open boll (few open bolls) stage until all hostable plants and food materials were eliminated either by defoliation and harvesting or a killing freeze. Additionally, growers had the option of using alternate insecticides in lieu of program treatments of Fyfanon® ULV during early and mid-season.

Aerial applications were made by airplanes equipped with a spray system designed and calibrated to deliver ultra-low volume. Each aircraft was equipped with a differentially corrected guidance system. This Global Positioning System (GPS) technology is similar to the one used in mapping, and was utilized for documentation and quality control purposes in the same manner as described previously (El-Lissy et al., 1997).

Fields that were located within close proximity to some of the designated environmentally sensitive sites or near permanent obstacles were treated with high-clearance ground sprayers. Mist blowers mounted on pickup trucks were also used to provide accurate placement of insecticide on corners and edges of fields and under power lines or821 other obstacles where airplanes had less accessibility (El-Lissy et al., 1996) (http://www.tpma.org/bwe/texas_program.html)."

**References (includes journals, agency/university reports, and internet links):**


1. http://www.ceris.purdue.edu/napis/pests/bw/facts.txt

2. http://www.aphis.usda.gov/ppq/weevil/. Animal and Plant Health Inspection Service.

3. http://www.simplelife.com./organiccotton/08WEEVLsng.html

4. http://www.tpma.org/bwe/texas_program.html. El-Lissy, Osama; Lindy Patton; Danny Kiser. 1999. Boll weevil eradication update -Tecas, 1998. Texas Boll Weevil Eradication Foundation, Inc. National Cotton Council, Memphis TN. Reprinted from the *Proceedings of the Beltwide Cotton Conference* Volume 2:818-823. Accessed on December 21, 2002

5. http://insects.tamu.edu/extension/bulletins/b-933.html#boll%20weevil

6. El-Lissy, O., Lindy Patton, Ray Frisbie, Tom Fuchs, Don Rummel, Roy Parker, Don Dippel, J.R. Coppedge, Gary Cunningham, Frank Carter, James Boston, and Jack Hayes. 1998. Boll Weevil Eradication Update- Texas, 1997. Proc. Beltwide Cotton Production and Research Conf. National Cotton Council of America. San Diego, CA. 1001-1006 pp.

7. El-Lissy, O., Frank Myers, Ray Frisbie, Tom Fuchs, Don Rummel, Rick Smathers, Ed King, Fred Planer, Chuck Bare, Frank Carter, Gary Busse, Nolan Niehus, and Jack Hayes. 1996. Boll Weevil Eradication Status in Texas. Proc. Beltwide Cotton Production and Research Conf. National Cotton Council of America. Nashville, TN. 831-837 pp.

8. El-Lissy, O., Frank Myers, Ray Frisbie, Tom Fuchs, Don Rummel, Roy Parker, Don Dippel, Ed King, Gary Cunningham, Frank Carter, James Boston, and Jack Hayes. 1997. Boll Weevil Eradication Update- Texas, 1996. Proc. Beltwide Cotton Production and Research Conf. National Cotton Council of America. New Orleans, LA. 973-979 pp.


**Available Mapping Information:**

**1.** http://www.ceris.purdue.edu/napis/pests/bw/

**2.** http://www.aphis.usda.gov/ppq/maps/bwe.pdf